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PLANETARY PHENOMENA FOR SEPTEMBER
AND OCTOBER, 1919
BY MALCOLM McNEILL

Pacific "Summer" Time of the Phenomena may be obtained by adding one hour to Pacific Time.

PHASES OF THE MOON, PACIFIC TIME			
First Quarter....	Sept. 2, 6 ^h 22 ^m A.M.	First Quarter....	Oct. 2, 12 ^h 37 ^m A.M.
Full Moon.....	" 9, 7 54 P.M.	Full Moon.....	" 9, 5 39 A.M.
Last Quarter....	" 16, 1 32 P.M.	Last Quarter....	" 15, 9 5 P.M.
New Moon.....	" 23, 8 34 P.M.	New Moon.....	" 23, 12 39 P.M.
		First Quarter...	" 31, 5 43 P.M.

Autumn begins September 23rd, 6^h36^m P. M. Pacific Time, when the Sun crosses the Equator from North to South at the autumnal equinox.

Mercury is at its greatest west elongation on September 1st, being then a morning star rising about an hour and a half before sunrise. The conditions for visibility are good; but the elongation is much smaller than the average of greatest elongation as the planet reaches perihelion only five days later; also the apparent distance between planet and Sun diminishes rapidly and before the middle of the month the planet rises less than an hour before sunrise. *Mercury* reaches superior conjunction with the Sun and becomes an evening star on September 26th. By the end of October the planet is well out toward greatest east elongation, but conditions for visibility are not good, the interval between setting of the Sun and of the planet remaining less than an hour. *Mercury* is in very close conjunction with *Saturn* on September 10th, the least distance being only 0°7', but unfortunately both planets are too near the Sun for naked eye observation.

Venus passes inferior conjunction with the Sun on September 12th, and becomes a morning star, and will continue as morning star until the summer of 1920. At the time of conjunction the planet is nearly 8° south of the Sun. This is nearly the maximum distance it can reach south of the ecliptic, the time of greatest heliocentric south latitude coming on September 10th; and as the real distance of the planet from the Earth is least at the time of inferior conjunction the apparent distance of planet from Sun at conjunction is nearly its maximum. The planet does not rise long enough before sunrise for naked eye visibility until well after the middle of September, but the interval increases rapidly, being two

hours on October 1st, and more than three and a half hours on October 31st. *Venus* is again at its greatest brightness on October 19th, about half way between inferior conjunction and greatest elongation. It will be easily visible to the naked eye in full daylight for some weeks.

Mars is drawing far enough away from the Sun to be easily seen, altho it will not begin to be much brighter than its minimum until after the close of the year. On September 1st it rises shortly before 3 A. M. local mean time and shortly before 2 A. M. on October 31st. During the two months it moves about 37° eastward and 11° southward among the stars from *Cancer* thru *Leo*. On October 7th it passes less than 1° north of the first magnitude star *Regulus* (*Alpha Leonis*). It is also in conjunction with *Jupiter* on September 2nd, passing $0^\circ 41'$ north, and in very close conjunction with *Saturn* on October 24th, the least distance between the planets being only $0^\circ 5'$, this occurring about 4 A. M. Pacific Time.

Jupiter is still a morning object, rising shortly before 3 A. M. on September 1st, and shortly before midnight on October 31st, local mean time. It moves about 10° eastward and 3° southward from *Cancer* into *Leo*, being at the end of October about 12° west and north of the first magnitude star *Regulus* (*Alpha Leonis*). Its conjunction with *Mars* on September 2nd has already been mentioned. Also it is in conjunction with *Neptune* on September 22nd, being about the Moon's diameter north of the latter at the time of nearest approach.

Saturn is a morning star on September 1st, having passed conjunction with the Sun on August 25th, but does not reach a sufficient distance from the Sun for easy visibility in the morning twilight until nearly the middle of the month. At the end of October it rises at about $1^h 30^m$ local mean time. Its motion is about 6° eastward and 2° southward in *Leo*, and on September 1st it is about 4° east of *Regulus*. The motion of the planet in its orbit is gradually bringing the plane of the rings nearer to the Earth, so that we see the rings more and more nearly edgewise, and the apparent diameter of the minor axis of the ring is only about one-tenth that of the major axis; as so little of the face of the ring is now turned toward the Earth, the planet is only about half as bright as it was during the early part of the year. Its conjunctions with *Mercury* on September 10th and with *Mars* on October 24th have been mentioned.

Uranus passed opposition with the Sun on August 23rd and is therefore in good position for observation. It is in the constellation *Aquarius* and moves slowly westward, about $1^{\circ}30'$ during the two months. Unfortunately there is no conspicuous star near the planet, so identification will not be easy. But on October 12th the planet is $1^{\circ}23'$ north of the fourth magnitude star, *Iota Aquarii*, and the planet will not be much more than 2° away from the star at any time during the period. A good star map will make identification of the planet not very difficult.

Neptune remains in the constellation *Cancer* and is above the horizon late at night, but is too faint for naked-eye observation.